

## CHAPTER 74 EVALUATE FAR PART 121/135 (10 OR MORE AND TURBINE POWERED AIRCRAFT) OPERATOR'S WEIGHT AND BALANCE CONTROL PROGRAM

### Section 1 Background

#### 1. PTRS ACTIVITY CODES

A. *Maintenance:* 3328/3329

B. *Avionics:* 5328/5329

**3. OBJECTIVE.** The chapter provides guidance for evaluating an operator/applicant's weight and balance control program.

#### 5. GENERAL

A. Approved weight and balance control procedures are the only means for an operator/applicant to authorize the use of other than known weights for crew, passengers, baggage, or cargo. The weight and balance control program, including loading schedules and charts, are approved on operations specifications by the Principal Maintenance Inspector. This program must be included in the operator/applicant's policies and procedures manual.

B. The operator/applicant may develop and submit for approval any method or procedure by which it can show that an aircraft:

- Is properly loaded according to approved configuration (loading schedules or charts)
- Will not exceed authorized weight and balance limitations during all ground and flight operations
- Will be periodically reweighed and its data re-evaluated
- Will have its data recalculated, if changes necessitate

C. The operator/applicant's weight and balance control procedures may either be an independently controlled document which includes all the instructions and procedures for maintenance, operations, and baggage/cargo control, or it may be included in the manual.

#### 7. ESTABLISHED WEIGHT AND CENTER OF GRAVITY (CG) LIMITS

A. During type certification, the aircraft manufacturer must flight test weight and balance under all conditions and establish center of gravity limits. These limits are approved by the FAA.

B. If an operator/applicant proposes an unusual or complex weight and balance program, or a program substantially different from the Approved Aircraft Flight Manual or Pilot Operating Handbook, regional assistance should be requested.

#### 9. LOADING PROCEDURES

A. *Use of Average Passenger Weights.* For aircraft operated under FAR Parts 121 and 135, average passenger and baggage weights may be authorized.

(1) Average weights may be determined by actually weighing passengers and baggage and documenting the weights. Average weights must be based on acceptable data collected during actual operations.

(2) Generally, average weights for operations in warm climates are lighter than those in colder climates. In establishing average passenger and baggage weights, operating environment must be considered. For example, clothing worn or carried in colder climates may affect the established weight.

**NOTE:** The average passenger and baggage weights in Advisory Circular 120-27, Aircraft Weight and Balance

**Control, as amended, do not comprise a regulatory requirement or authorization. This information is guidance only and must be evaluated for applicability to individual operators.**

B. *Non-Standard Weight Groups.* C. Average weights are not suitable for groups that tend to be heavier or lighter than the average. The operator/applicant must use actual weights for loading non-standard weight groups and their baggage (such as athletic squads, military personnel, and children’s groups).

D. *Carry-on Baggage.* Procedures must be provided for controlling carry-on baggage.

(1) Carry-on baggage must be limited to articles that may be placed in an overhead compartment that causes the weight limit of the compartment to be exceeded.

(2) Carry-on baggage weight must either be accounted for in the same manner as checked baggage or be added to the passenger weight.

(3) Operators using average weights for computing weight and balance should re-evaluate carry-on baggage weight at least once per year.

**11. AIRCRAFT WEIGHTS**

A. *Weighing of Aircraft*

(1) Aircraft operated under FAR Part 135 are required to be weighed at least once every 36 calendar months. Both the operator/applicant’s operations specifications and manual must reflect this requirement.

(2) Aircraft operated under FAR Part 121 are

required to be weighed at intervals approved by the Principal Maintenance Inspector.

B. *Use of Fleet Weights.* A fleet generally is considered to be three or more aircraft of the same model and configuration. This allows realistic averages to be determined.

(1) Aircraft operating under fleet weights must be weighed in accordance with the operator/applicant’s instructions. The operating weights and center of gravity position must be within established limits. The use of fleet weights is authorized by operations specifications.

(2) An operator’s empty fleet weight is determined by averaging aircraft weights as follows:

<i>Fleet Size</i>	<i>Weighing Policy</i>
3 aircraft	Weigh all aircraft
4 - 9 aircraft	Weigh 3 aircraft plus at least 50 percent of the number over 3
Over 9 aircraft	Weigh 6 aircraft plus at least 10 percent of the number over 9

C. Scales used to weigh passengers, aircraft, cargo, and baggage must be calibrated and traceable to a national standard. Calibration must be performed in accordance with the civil authority for weights and measures having jurisdiction over the area in which the scales are used. The frequency of testing depends on use and handling.

**13. CONTRACTORS.** An operator/applicant may use a contractor to weigh items required to be weighed. However, the operator/applicant is responsible for ensuring the contractor complies with the operator/applicant’s approved weight and balance control program. This includes ensuring scales are calibrated and tested in accordance with the operator/applicant’s Policies and Procedures Manual.

## Section 2 Procedures

### 1. PREREQUISITES AND COORDINATION REQUIREMENTS

#### A. Prerequisites

- Knowledge of the regulatory requirements of FAR Parts 121 and 135
- Successful completion of Airworthiness Inspector's Indoctrination Course for General Aviation and Air Carrier Inspections, or previous equivalent
- Previous experience with FAR Part 121, 125, or 135 weight and balance programs

B. *Coordination.* This task requires close coordination between maintenance and operation inspectors.

### 3. REFERENCES, FORMS, AND JOB AIDS

#### A. References

- FAR Parts 21, 43, and 91
- Advisory Circular 91-23, Pilot's Weight and Balance Handbook, as amended
- Advisory Circular 120-27, Aircraft Weight and Balance Control, as amended
- Approved Flight Manuals
- Approved Weight and Balance Manuals
- Type Data Sheets and Aircraft Specifications
- Supplemental Type Certificates
- Aircraft Equipment Lists

- Aircraft Maintenance Records (Weight and Balance Records)

#### B. Forms.

- FAA Form 8400-8, Operations Specifications

#### C. Job Aids.

- Automated operations specifications checklists and worksheets

### 5. PROCEDURES

A. *Coordinate with the Operator/Applicant.* Operator/applicant must submit the following for review:

- Manual or revision
- Weight and Balance Program document (if not part of a manual)
- Pertinent company procedures
- Instructions for completing forms used in aircraft weight control and aircraft loading
- Mathematical justification for loading provisions or schedules

B. *Review the Operator/Applicant's Manual/Program Document.* The manual must include procedures, levels of authority, and information appropriate to FAR Part 121 or 135. In addition, the following must be included:

(1) Manual introduction, to include:

- Description of the philosophy and the goals of the manual
- Description of the division of contents between volumes, if more than one volume

- List of effective pages, including dates

(2) Manual revision and distribution procedures, to ensure:

- Current information is provided to all manual holders
- Manuals are available to maintenance, operations, and ground personnel and are furnished to the Certificate Holding District Office (CHDO)

(3) Definitions of all significant terms used in the program. The definitions must reflect their intended use and include any acronyms or abbreviations unique to the manual.

(4) Description of the organizational unit responsible for the control and maintenance of the weight and balance program, to include:

- Definitions of lines of authority
- Description of the support structure

(5) Job descriptions for all elements

(6) Training programs that include the following:

- Maintenance personnel
- Operations and dispatch personnel
- Ground handling personnel

(7) A means of documenting and retaining individual training records

(8) Procedures for:

- Determining standards and schedules for calibration of aircraft scales

- Pre-weighing instructions and requirements
- Determining which aircraft are to be weighed
- Establishing and maintaining equipment lists for each aircraft
- Recording the type and serial number for each scale used, airplane weight, residual fluids, and scale tare weights
- Initial weighing of aircraft
- Monitoring and adjusting individual aircraft or fleet, empty weight and center of gravity
- Periodic reweighing of aircraft
- Ensuring aircraft are configured in accordance with approved data

(9) A loading schedule consisting of graphs/tables or a special loading schedule for a calculator or computerized program. These schedules must ensure that pertinent data is available concerning all probable weight and balance conditions of the aircraft.

(10) A load manifest on which all required loading information shall be entered by personnel responsible for weight and balance control, including procedures for:

- Completing the load manifest
- Ensuring load manifest is carried on the aircraft
- Retaining the load manifest for the time periods specified in the Federal Aviation Regulations (FAR)
- Distribution of the load manifest in accordance with FAR §§ 121.695 and/or 121.697 (as applicable), and 135.63(c)

(11) Procedures to be used by crew members, cargo handlers, and other personnel concerned with aircraft loading, for the following:

- Distribution of passengers
- Distribution of fuel
- Distribution of cargo
- Verification and acceptance of actual cargo weights as listed on a bill of lading
- Restriction of passenger movement during flight, if applicable
- Hazardous material requirements, if applicable

(12) A drawing of each cargo and/or passenger configuration to include emergency equipment locations

(13) Mathematical justification for loading provisions or schedules. This may be included under separate cover and not as part of the company manual.

(14) An alternate procedure for allowing manual computations, if a computerized weight and balance program is utilized

(15) Procedures for a weight range system, if applicable, that ensures:

(a) The range is typical of passengers carried on similar operations

(b) Computations for critical load considerations support the ranges

(c) Personnel responsible for loading the aircraft are required to prepare appropriate loading records

(d) The system includes methods for loading passengers whose weights are outside the range

(e) Loading records indicate the number of passengers within the stated range and account for passengers that do not fall within the range

(16) A system for loading nonstandard weight groups, such as athletic squads or military groups and their baggage, which must utilize actual weights for both passengers and baggage

(17) Procedures to verify actual weight of cargo

(18) Standards and schedules for calibration of commercial scales used to determine baggage/cargo weights

(19) Procedures to ensure that carry on baggage is limited to articles which may be placed in overhead compartments or under seats. Carry-on baggage weight must be accounted for in the same manner as checked baggage or added to the average passenger weight.

*C. Review the Operator/Applicant's Operations Specifications.* Review the draft operations specifications Paragraph E includes the following:

(1) Aircraft make/model/series

(2) Type of loading schedule

(3) Loading schedule instructions for:

- Passenger and crew (average or actual weight)
- Baggage (average or actual weight) and cargo (actual)
- Nonstandard weight groups

(4) Weight and balance control procedures

**NOTE: The above items must be referenced by indicating the locations in the operator/applicant's manuals, e.g., volume, chapter, etc.**

*D. Analyze the Results.* Upon completion of review,

analyze the results and determine whether the operator/applicant's manual and operations specifications meet all requirements.

E. *Meet With Operator/Applicant.* Discuss any discrepancies with the operator/applicant and advise what areas need corrective action.

## 7. TASK OUTCOMES

A. *File PTRS Transmittal Form*

B. Approve operations specifications in accordance with Vol. 2, Ch. 84, FAR Part 121/135 Operations Specifications

C. *Document the Task.* File all supporting paperwork in the operator/applicant's office file.

9. **FUTURE ACTIVITIES.** Normal surveillance.